

as were the head feathers and there was slight moult of the abdomen. The tail quills appeared worn. We remarked on the long hind claws and the strong muscular thighs.

The lack of black on the breast, and the colour of the inside of the mouth (in singing males the inside of the mouth is yellow) suggests the individual was either a female or immature.

The bird remained quiet throughout the period it was in the holding cage and whilst being handled. It made no attempt to bite or grasp one's hand with its claws. It was quite silent and we never at any time heard it utter a sound of any kind. It showed no sign of distress. This docility and tameness was in sharp contrast with the behaviour of the Bristle-bird, which struggled and squeaked whilst it was held in the hand and attempted to bite the fingers.

The Scrub-bird was ringed with a C.S.I.R.O. ring (050-03501) on one leg and a yellow plastic ring on the other. At 5 p.m., i.e. after being just over 3 hours in captivity, it was released with two movie cameras trained on it. It darted rapidly into the bushes with a "mouse-like" movement and the tail held parallel to the ground. A study of the film afterwards revealed that it bounded "with both legs together" (G. Pizzey, *in litt.*).

The Bristle-bird was also ringed and released. Description: Three very strong bristles in front of the eye on either side. Iris, light brown; beak, black, lower mandible pale grey; legs, pale blue-grey; inside of mouth, pale yellow behind, grey flesh in front. Measurements: Length in the flesh, 199 mm.; weight, 30.0 gm.; wing, 64 mm. The tarsus was scutellate in front and booted behind. Soles, buffy-grey. The black claws were sharp. No moult was evident in the wings but the middle tail feathers were half-grown.

NESTING OF FAIRY TERNS AND SILVER GULLS AT WALYUNGUP LAKE, WESTERN AUSTRALIA

By JULIAN FORD, Perth.

Walyungup Lake lies on the Swan coastal plain about two miles from the coast near Safety Bay. It covers an area of about 734 acres when full, is of low salinity, and has a bottom of gypsum overlying sand and limestone. During the dry summer period much of the lake evaporates, exposing the hard flat bottom of gypsum, except for two expansive deep areas near the centre and south end of the lake. For the past several years the gypsum has been exploited for the construction of road foundations, it being first bulldozed into large mounds where the lake has dried out before being removed. With the rise in the water level in winter, these gypsum piles are transformed into small islands separated by several chains from the shoreline by water up to three feet deep, and remain as such until January by which time the shallow areas have again evaporated.

From about 1958 onwards, these islands have been utilised as breeding sites by the Fairy Tern (*Sterna nereis*) and Silver Gull (*Larus novaehollandiae*). Observations on the nesting of these species form the basis of this contribution.

FAIRY TERN BREEDING

It was first discovered that Fairy Terns nested on the gypsum islets in Walyungup Lake on February 15, 1958, when P. S. Stone and I saw four nuptial-plumaged adults with three mottled-plumaged juveniles, two of which were barely capable of flying (see

Hitchcock, 1959: 106). These birds probably represented the remnants of a breeding colony.

In the following breeding season the lake was first visited on November 30, 1958, when about 10 birds were engaged in fish carrying pre-nuptial display flights. These consisted of rapid pursuit flights involving two birds with the rear individual holding a small fish crosswise in the bill while both birds called repeatedly. Once a pair landed on an islet where fish presentation was performed. On December 20, thirty birds had taken up nesting positions on the islet used previously, there being several nesting scrapes but no eggs. When the colony was revisited on January 4, 1959, there were four nests with one egg, but Fairy Terns were absent from the lake. Despite the high water level of the lake, apparently the nesting site had been deserted, for birds were not seen on later visits during the nesting season.

About 100 pairs of Fairy Terns used the same nesting site in the 1959-60 season, while several pairs also nested on two adjacent islets. Nesting was first discovered on November 21, 1959, after which the colony was regularly inspected. The following table summarises breeding data obtained on each visit:

Date	1 egg	2 eggs	1 egg + 1 chick	1 chick	2 chicks	empty
Nov. 21 ..	34	27	3	16	9	18
Nov. 28 ..	36	17	1	34	3	?
Dec. 5 ..	29	10	1	68*	1	?
Dec. 19 .	25	3	0	0	0	0

*Includes both chicks and runners.

Allowing for an incubation period of about 20 days and a fledgling period of 28 days, egg laying must have commenced a little after mid-October. The colony was found deserted on December 19, 1959 and all eggs had been neatly pecked presumably by the terns rather than some predatory species like the Silver Gull which usually devours most of the egg. The contents of all relatively fresh eggs had been removed, apparently by suction, and eggs with developed embryos had only a small neat hole pecked in them.

The nesting site was shifted during the 1960 spring because of the removal of the previously used islet the preceding summer, while the shallow parts of the lake were dry. Only three nuptial-plumaged adults were seen on October 22, 1960, but on November 27 nesting was in full momentum. Nesting data for the breeding season are tabulated below:

Date	1 egg	2 eggs	1 egg + 1 chick	1 chick	2 chicks	empty
Nov. 27 ..	18	10	2	16	5	6
Dec. 3 ..	20	7	0	24*	1	13
Dec. 8 ..	15	5	0	6	0	?
Dec. 26 ..	8	5	0	0	0	0

*Includes both chicks and runners.

On December 26, 1960, there was no sign of any chicks on the islet, and on January 20, 1961, all evidence of eggs had vanished. However on a nearby islet, completely connected to the shore because of the low water level, a nest with a single egg was found which was defended vigorously by one bird. No interest whatsoever was displayed towards the main site by terns feeding over the central deep section of the lake. The level of the lake had fallen resulting in no islet being entirely surrounded by water.

It appears that although egg laying continued until December 3, no more eggs were hatched after this date.

No breeding occurred at Walyungup Lake in the 1961-62 period probably as a consequence of the very low water level of the lake, although two birds were seen on September 30, 1961, and October 14. I did not visit the lake in the following breeding period.

Twenty terns in nuptial plumage were seen on November 16, 1963, and none on December 10. The lake was next revisited on January 27, 1964, and on subsequent dates when the following data were obtained:

Date	1 egg	2 eggs	1 egg + 1 chick	1 chick	2 chicks	empty
Jan. 27 . .	5	4	1	2	0	?
Feb. 2 . .	5	7	0	3	0	7
Feb. 16 . .	2	3	0	9*	1	?
Feb. 23 . .	1	0	0	0	0	0

*Includes 4 runners.

On January 27, about 20 terns were nesting on an islet which had not been previously used; a pair was using an adjacent islet. Nesting probably commenced late because new scrapes and additional eggs were found on the February 2 visit. Once again nesting was abandoned when the lake level fell so that the islet was connected to the shore.

Serventy (1950) found the Fairy Tern nesting on Rottnest Island in January and February. The Walyungup Lake breeding data support Storr (1960) who has shown that, because Serventy's visits were confined to the annual school vacation in January and February, his Rottnest Island data are biased, and in fact the Fairy Tern commences nesting in early November and sometimes in late October. Actually Serventy's data clearly show that the colonies were discovered some weeks after the commencement of nesting, but this was overlooked by Hitchcock (1959) in his review of nesting seasons (Storr, *loc. cit.*).

Although Fairy Terns were frequently seen fishing over Walyungup Lake and occasionally Cooloongup Lake, birds were also observed flying towards the coast where undoubtedly they fished over the sea. This is confirmed by the small marine fish-species, including smelt, sardines, white-bait and small skipjack, which were found at the nesting sites.

The opportunity is here taken to document another hitherto unreported nesting site. Penguin Island is not listed by Serventy and Whittell (1962) as a breeding station of the Fairy Tern. On November 4, 1952, a number of terns was seen congregated on a small sandy limestone section near the southern end of the island, and an inspection of the area revealed several recently prepared nesting depressions. No further observations on the progress of the colony were made.

MOVEMENTS

A ringing programme was embarked upon in 1959 with the view of studying certain aspects of the life history of the species. Of 107 pre-flying young banded to date at Walyungup Lake, 4 have been recovered away from the nesting station. These are listed below:

1. Nestling ringed on November 21, 1959, found dead at Kwinana on Jan 14, 1960.
2. Nestling ringed on November 28, 1959, trapped alive at Pelican Point by D. L. Serventy on February 3, 1960.

3. Nestling ringed on November 21, 1959, trapped alive at Pelican Point by D. L. Seventy on February 4, 1960.
4. Nestling ringed on November 21, 1959, trapped alive at Government House Lake, Rottnest Island, by D. G. Bathgate on December 3, 1961.

The latter recovery constituted a member of a breeding colony of about 150 pairs and was incubating a 2 egg clutch. Since the species did not breed at Walyungup Lake during the 1961-62 season, it is possible that birds which had nested at Walyungup Lake in former seasons, bred on Rottnest Island. The two recoveries from Pelican Point indicate that the species is attracted to the Swan River estuary which serves as a feeding ground.

Some significant sight observations of ringed birds have been forthcoming. On October 31, 1963, A. G. Mathews saw two Fairy Terns, both of which had a metal band on each leg, at Pelican Point, while on November 2, 1963, A. Burbridge saw a similarly ringed bird at Mandurah. All three were banded at Walyungup Lake where numbered aluminium bands and coloured anodised bands were placed on the right and left legs respectively up to December 3, 1960.

In south-western Australia the Fairy Tern is strictly migratory, moving north in the autumn and early winter, and returning during early September (Storr, *loc. cit.*). Fairy Terns are absent from the Walyungup Lake and Safety Bay areas during the winter period. They usually leave Walyungup Lake immediately after the completion of the nesting cycle, but remain for a further few months in the Safety Bay area before migrating north.

SILVER GULL

BREEDING

Indications of breeding at Walyungup Lake were first noticed on November 30, 1958, when about 20 adults and 3 recently fledged young were seen. Breeding was definitely established on November 21, 1959, when an old nest was located. On December 15, 1959, three islets were the sites of 6, 3 and 1 old nests.

More precise breeding data were obtained in the following spring. On October 22, 1960, there were about 50 adult gulls, a nest with 2 eggs, another with a small dead chick, several fledglings and about 10 old nests on the gypsum islets.

The size of the nesting colony increased slightly in 1961. On September 30, a nest with one egg, 6 nests with 2 eggs, a nest with one chick, 4 nests with 2 chicks, a nest with 2 dead chicks, 2 empty nests and a runner were noted. On October 14, there were two nests with 2 chicks, a nest with 2 eggs, a nest with one egg plus one chick, and 16 runners plus juveniles.

At Shoalwater Bay, Carnac Island and Rottnest Island, the Silver Gull has a bimodal breeding season with peaks in May and September (Seventy and White, 1943). Whether Silver Gulls nest in the autumn at Walyungup Lake has not been ascertained although it is probable that they do.

MOVEMENTS

Recoveries of ringed Silver Gulls in south-western Australia analysed by Carrick *et al.* (1957) have revealed that young birds bred on the coastal islands near Perth, disperse southwards along the coast for distances up to 100 miles, and randomly throughout the Perth area.

Walyungup Lake gulls exhibit a similar dispersal pattern from their natal area. The recoveries of gulls banded at Walyungup Lake are set out below:

1. Runner ringed on November 5, 1961, recovered sick near the Narrows Bridge, Swan River, on January 8, 1963.
2. Non-flying young ringed on November 5, 1961, recovered dead at Victoria Park, 28 miles NNE on January 20, 1963.
3. Nestling banded on September 30, 1961, caught on a fishing line and shot at the Bunbury jetty, 72 miles south, on April 8, 1962.

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NOTES ON TWO SPECIES OF WESTERN AUSTRALIAN COMPOSITAE

By J. H. WILLIS.*

1. *TRICHOCLINE SPATHULATA* (A. Cunn. ex DC.) J. H. Willis, comb. nov.

Celmisia spathulata A. Cunn. ex DC. *Prodr. Syst. Nat. Regn. Veg.*, 5: 209 (Oct. 1836);

Trichocline scapigera (Benth.) F. Muell. *Syst. Cens. Aust. Plant.*, 85 (1882);

Amblysperma scapigera Benth. in Endl. et al. *Enum. Plant. Nov. Holl. (coll. Huegel)*: 67 (1837), atque *Flora Aust.*, 3: 676 (1866).

The tribe *Mutisieae* of the daisy family (*Compositae*) is predominantly South American, including forest climbers with colourful spectacular flower-heads. One of the larger genera is *Trichocline*, of which some 40 species occur in South America and a single very isolated representative, *T. spathulata*, locally known as the Native Gerbera, in Western Australia—a striking and perplexing example of disjunct distribution. No other member of this tribe is indigenous to the Australian Commonwealth, but the South African *Gerbera jamesonii*, in a wide range of pastel colours, is popular as a perennial garden herb. Indeed, our *Trichocline* has close affinities with *Gerbera* and might well be regarded as the "gerbera" counterpart on this side of the Indian Ocean—just as *Cymbonotus* is the Australian analogue of *Arctotheca* (Capeweed).

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